

**LATEST
EDITION**



SPSC | IBA | NTS

HST | SST

**HIGH SCHOOL TEACHER | SECONDARY SCHOOL TEACHER
TEST GUIDE**

Includes:

- According to SPSC Syllabus
- Questions from Text Books
- Covering All Subjects
- To The Point Study Material
- Original Solved Past papers

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CHEMISTRY

- Which one of the following options shows a group of elements?
(a) Mercury, water, Ammonia (b) Iodine, Tin, Iron
(c) Copper, Aluminum, Methane (d) Coal, smoker, Fog
- Which one of the following is a compound and can be broken down into simpler substances:
(a) Ammonia (b) Oxygen
(c) Sulphur (d) Iron filling
- The mass in grams of one mole of HNO_3 is:
(a) 60 (b) 100
(c) 63 (d) 98
- Which of the following shows nitrogen gas molecule.
(a) N_2O (b) N_2
(c) NO (d) NO_2
- Which one of the following represents two moles of water (H_2O):
(a) 1.084×10^{25} molecules (b) 6.022×10^{23} molecules
(c) 1.204×10^{24} molecules (d) 1.806×10^{24} molecules
- A compound can be defined as
(a) Different kinds of atoms mixed together
(b) The same kind of atoms mixed together
(c) Different kinds of atoms chemically combined together
(d) The same kind of atoms chemically combined together
- Select the option that shows a triatomic molecule:
(a) CO_2 (b) O_2
(c) CH_4 (d) NH_3
- Hydrogen exists as
(a) a monoatomic gas (b) a mixture of hydrogen atoms
(c) a diatomic gas with each molecule made up of two atoms
(d) a diatomic atom made up of two molecules
- Which one of the following compounds has the same empirical and molecular formula.
(a) benzene (C_6H_6) (b) hydrogen peroxide (H_2O_2)
(c) water (H_2O) (d) glucose ($\text{C}_6\text{H}_{12}\text{O}_6$)
- Which one of the following is a homogeneous mixture of molecular gases.
(a) smoke (b) air
(c) fog (d) smog

STRUCTURE OF ATOM

- Number of electrons that can be easily accommodated in third energy level is:
 (a) 10 (b) 18
 (c) 32 (d) 64
- Mass of an atom is concentrated mostly in the
 (a) nucleus (b) neutrons
 (c) electrons (d) protons
- If Rutherford had used neutrons instead of alpha particles in his Gold-foil experiment, the neutrons would
 (a) not deflect because they have no charge
 (b) have deflected more often
 (c) have been attracted to the nucleus easily
 (d) have given the same results
- Electron orbiting in its ground state does not
 (a) spin (b) revolve
 (c) radiate energy (d) reside in orbit
- Which statement about the elements $^{12}_6\text{X}$ and $^{14}_6\text{Y}$ is false
 (a) they are isotopes (b) they are the same elements
 (c) they have the same number of electrons
 (d) they have the same number of neutrons
- The particle of neutron
 (a) has a mass equal to that of a electron
 (b) has a mass approximately equal to that of a proton
 (c) has charge equal to but opposite to that of an electron
 (d) has a positive charge
- Isotopes of an element have
 (a) the same number of protons
 (b) the same number of neutron
 (c) different number of electrons (d) the same mass number
- Which one has the smallest mass
 (a) an alpha particle (b) a hydrogen atom
 (c) an electron (d) a proton
- The nucleus of an atom represents all of the following characteristics except that it
 (a) is positively charged (b) is very dense
 (c) contains nearly all of the atom's mass
 (d) contains nearly all of the atom's volume
- L - shell has the following sub-shell(s)
 (a) s (b) s and p
 (c) s, p and d (d) s, p, d and f

PERIODIC TABLE AND PERIODICITY OF PROPERTIES

- (i) Which of the following elements is a halogen
 (a) silicon (b) antimony
 (c) iodine (d) arsenic
- (ii) Which of the following elements would have the smallest first ionization energy:
 (a) K (b) P
 (c) S (d) Ca
- (iii) if an element has configuration 2, 8, 1. It can be placed in _____ :
 (a) group I and III period (b) group III and I period
 (c) group I and VII period (d) group VII and III period
- (iv) Which of the following elements behaves most similar to carbon:
 (a) nitrogen (b) boron
 (c) oxygen (d) silicon
- (v) elements having valence electron in their s- orbital are:
 (a) metals (b) non-metals
 (c) metalloids (d) transition
- (vi) Which of the following shows the largest ionization energy:
 (a) Na (b) Al
 (c) H (d) He
- (vii) Elements in a _____ show similar chemical properties such as chemical reactions
 (a) period (b) group
 (c) both a and b (d) neither a nor b
- (viii) An element with complete outer shell belongs to
 (a) alkali family (b) halogen family
 (c) noble family (d) carbon family
- (ix) The modern periodic table is arranged according to _____ of elements.
 (a) atomic number (b) mass number
 (c) neutron number (d) isotope number
- (x) Atomic shielding is due to:
 (a) neutron (b) Proton
 (c) proton and neutron (d) electron

STRUCTURE OF MOLECULES

- i. An atom that loses or gain electron is called
 - a. an electron
 - b. a molecule
 - c. a metal
 - d. an ion
- ii. Element X is in group VI of the periodic table. After becoming an ion it will be represented as
 - a. X^+
 - b. X^-
 - c. X^{-2}
 - d. X^{+2}
- iii. Which pair of elements will lose and gain an electron respectively to form a compound.
 - a. Magnesium and Chlorine
 - b. Sodium and Oxygen
 - c. Potassium and Fluorine
 - d. Lithium and Sulphur
- iv. Calcium ion is formed when (Ca^{+2}):
 - a. it loses an electron
 - b. it loses two electrons
 - c. it gains electron
 - d. gains two electrons
- v. A covalent bond is formed when an electron is shared between
 - a. Sodium and Oxygen
 - b. Copper and Oxygen
 - c. Carbon and Oxygen
 - d. Magnesium and Oxygen
- vi. Atoms _____ when an ion is formed
 - a. only gains electrons
 - b. share electrons
 - c. loses and gain of electrons
 - d. only lose electrons
- vii. Electronic configuration of Fluorine is 2,7 and of Oxygen 2,6. Fluorine oxide will be represented as
 - a. FO
 - b. F_2O
 - c. FO_2
 - d. F_2O_2
- viii. Which of the following statement is incorrect about covalent bonding.
 - a. HCl contains one pair of shared electron
 - b. CCl_4 contains four pairs of shared electrons
 - c. H_2O contains three pairs of shared electrons
 - d. NH_3 contains three pairs of shared electrons
- ix. Which of the following ions do not have the electronic configuration similar to an argon atom?
 - a. Ca^{+2}
 - b. S^{-2}
 - c. K^+
 - d. O^{-2}

- x. Which one of the following option show a group of Ionic compounds?
- Calcium Oxide, Hydrogen Chloride, Magnesium Oxide
 - Calcium Oxide, Magnesium Oxide, Sodium Chloride
 - Carbon Dioxide, Copper Sulphate, Hydrogen Chloride
 - Copper Sulfate, Methane, Sodium Chloride

PHYSICAL STATES OF MATTER

Choose the correct option.

- Random mixing of particles is called:
 - evaporation
 - sublimation
 - diffusion
 - boiling
- Which of the following is not a property of molecules in solid
 - they move at great speed
 - they are arranged in regular pattern
 - there is a very little space between the particles
 - the force of attraction between the particles are strong
- when vapor pressure of liquid becomes equal to _____ it reaches its boiling point
 - 760cm of Hg
 - 1 Pascal
 - 101.325 kilo Pascal
 - 0.1 atm
- The vapor pressure of a liquid is proportional to
 - increase of pressure
 - increase of temperature
 - increase of intermolecular forces
 - increase of polarity of molecules
- Water normally boils at 100°C but to achieve its boiling point at a lower temperature
 - increase external pressure
 - decrease external pressure
 - increase surface area
 - decrease surface area
- In a closed system the vapor pressure of liquid depends on
 - amount of liquid
 - surface area of the liquid
 - temperature
 - both (b) and (c)
- Which one of the following do not represent amorphous solids
 - rubber
 - glass
 - glucose
 - plastic
- At freezing point which two states coexist in dynamic equilibrium:
 - gas and solid
 - liquid and gas
 - liquid and solid
 - all of these
- Color spreads in water due to the process of
 - vapour pressure
 - (b) expansion
 - diffusion
 - compressibility of water

- x. What will be the pressure of a gas, if we increase the volume of the gas from 1.5 dm^3 to 3 dm^3 at 2 atm .
- | | |
|------------------------|-------------------|
| a. <u>1 atmosphere</u> | b. 1.5 atmosphere |
| c. 2 atmosphere | d. 2.5 atmosphere |

SOLUTIONS

Choose the correct option.

- i. Among the following option more dilute is

a. 1.0M	b. 0.5M
c. 0.05M	d. <u>0.005M</u>
- ii. Milk is a solution also specifically known as

a. Solution	b. Saturated solution
c. <u>Colloids solution</u>	d. Suspension
- iii. Water drop suspended in air is an example of solution:

a. Gas in gas	b. Gas in liquid
c. <u>Liquid in gas</u>	d. Liquid in liquid
- iv. When there is a high concentration of solvent in a solution, it is known as:

a. <u>dilute solution</u>	b. saturated solution
c. concentrated solution	d. super saturated solution
- v. What will be the molarity of a NaNO_3 solution if it is made by diluting 250.0 cm^3 of a 1.60 M solution to a final volume of 400 cm^3 :

a. 1.20 M	b. <u>1.00 M</u>
c. 0.200 M	d. 0.160 M
- vi. If a solution contains 15.0 g KCl in 600.0 cm^3 solution. What is the concentration, in % mass by volume (m/v).

a. 5.00%	b. 2.00%
c. 0.200%	d. <u>2.50%</u>
- vii. When KCl dissolves in water, it will dissociate in the following ions

a. K and Cl	b. <u>K^+ and Cl^-</u>
c. K and Cl_2	d. K^+ and Cl_2
- viii. What will be Molarity of Na_2SO_4 when 2 moles of Na_2SO_4 are dissolved in 1 dm^3 of solution.

a. 1 M	b. <u>2 M</u>
c. 3 M	d. 0.5 M
- ix. Number of moles of a solute dissolved in _____ will determine its molarity

a. 1 kg of solvent	b. 1 kg of solution
c. 1 dm^3 of solvent	d. <u>1 dm^3 of solution</u>
- x. The molarity of An NaOH solution produced by dissolving 4 g of it in 250 ml of water is:

a. <u>0.4 M</u>	b. 0.8M
c. 0.2 M	d. 0.1M

ELECTROCHEMISTRY

Choose the correct option.

- i. The oxidation state of a molecule of nitrogen N_2 is:
 - a. +1
 - b. +3
 - c. 0
 - d. -3
- ii. What is the oxidation state of C in CH_3OH :
 - a. -2
 - b. -1
 - c. 0
 - d. +1
- iii. An ion attracted to a cathode is
 - a. neutral
 - b. negatively charged
 - c. positively charged
 - d. no charges
- iv. Electrons are lost in a reaction by a
 - a. reducing agent as it undergoes oxidation
 - b. reducing agent as it undergoes reduction
 - c. oxidizing agent as it undergoes oxidation
 - d. oxidizing agent as it undergoes reduction
- v. What is the oxidation number of manganese in the compound $KMnO_4$:
 - a. +7
 - b. +3
 - c. +2
 - d. +4
- vi. oxidation state of phosphorus changed from 3 to 0 in a particular redox reaction, with the given information we can assume that phosphorus
 - a. Lost 3 electrons and was reduced.
 - b. Lost 3 electrons and was oxidized.
 - c. Gained 3 electrons and was reduced.
 - d. Gained 3 electrons and was oxidized.
- vii. In an electrochemical cell:
 - a. Oxidation occurs at the anode only.
 - b. Reduction occurs at the anode only.
 - c. Oxidation occurs at both the anode and cathode.
 - d. Reduction occurs at both the anode and cathode.
- viii. Sulfur will have an oxidation number of +7 in:
 - a. HSO_3^-
 - b. SO_3
 - c. H_2SO_4
 - d. $H_2S_2O_8$
- ix. Fate of a reducing agent in an oxidation-reduction reaction:
 - a. It is oxidized as it gains electrons.
 - b. It is oxidized as it loses electrons
 - c. It is reduced as it gains electrons.
 - d. It is reduced as it loses electrons.

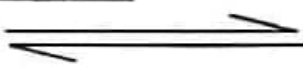
- x. In an electrochemical cell, direction of electrons is
- From the anode to the cathode through the external circuit
 - From the anode to the cathode through the salt bridge
 - From the cathode to the anode through the external circuit
 - From the cathode to the anode through the salt bridge

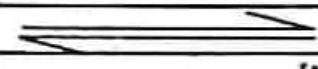
CHEMICAL REACTIVITY

Choose the correct option.

- Bromine exists in _____ at room temperature and is a non-metal
 - Solid state
 - Liquid state
 - Gaseous state
 - Plasma state
- Reaction of metals with a halogen produces
 - Halides
 - Oxides
 - Halogen sulphides
 - Hydrogenated compounds
- Alkali metals act as:
 - Oxidising agents
 - Dehydrating agents
 - Reducing agents
 - All the above
- The metal with the highest ionization energy among alkali metals is:
 - Na
 - Li
 - Rb
 - cs
- Group 7 elements exist as liquids and gases but _____ exists as solid.
 - Chlorine
 - Fluorine
 - Iodine
 - Bromine
- How easily a metal loses electron is called its
 - Electronegativity
 - Electro positivity
 - Electroplating
 - Electrolysis
- The word Alkali is derived from an Arabic word that means
 - Base
 - Basic salt
 - Acid
 - Ashes
- The oxide of alkaline earth metals are
 - Acidic
 - Basic
 - Amphoteric
 - Neutral
- Which one of the following does not belong to group 1 of periodic table
 - Francium
 - Cesium
 - Rubidium
 - Radium
- Group II elements are known as Alkaline Earth Metals because:
 - Their oxides are basic
 - Their oxide and hydroxides are water soluble
 - Both a and b
 - They are found in earth

CHEMICAL EQUILIBRIUM

- When dynamic equilibrium is achieved
 - The reverse reaction stops
 - The forward reaction stops
 - Both forward and reverse reactions stop
 - Both forward and reverse reactions continue at the same rate**
- A reversible reaction have the following characteristics except
 - They proceeds in both direction
 - They never complete
 - Products do not form reactants again**
 - They are represented by 
- For the given reaction, K_c is,

$N_{2(g)} + O_{2(g)}$		$2NO_{(g)}$
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 - $\frac{[2N][2O]}{[2NO]}$
 - $\frac{[N]^2[O]^2}{[2NO]}$
 - $\frac{[N_2][O_2]}{[NO]^2}$
 - $\frac{[NO]^2}{[N_2][O_2]}$**
- The equilibrium constant (K_c) can be defined as:
 - The sum of the two reactants
 - The difference of the two rate constants
 - The ratio of the two rate constants**
 - The product of the two rate constants
- Small value of K_c shows that
 - reaction will go in the forward direction**
 - reaction will go in the reverse direction
 - reaction is at equilibrium
 - equilibrium will never establish
- For which of the following options the K_c will have no units
 - $4NH_{3(g)} + 5O_{2(g)} \rightleftharpoons 4NO_{(g)} + 6H_2O$
 - $N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$
 - $N_{2(g)} + O_{2(g)} \rightleftharpoons 2NO_{(g)}$**
 - $CO_{(g)} + 3H_{2(g)} \rightleftharpoons CH_{4(g)} + H_2O_{(g)}$
- Very large value of K_c shows that
 - Reaction is at equilibrium
 - Equilibrium will never be achieved.
 - Reaction will move in the forward direction
 - Reaction will move in the reverse direction**
- Active mass can be defined as
 - The total mass of reactants
 - The total mass of products

8. Choose a basic salt:
 a. KCl
 b. NaCl
 c. Pb(OH)Cl
 d. KHSO₄
9. A base that dissolves in water is called
 a. Acids
 b. Alkalis
 c. Salts
 d. Amphoteric
10. Select weak acid from the following options
 a. HNO₃
 b. CH₃COOH
 c. HCl
 d. H₂SO₄

ORGANIC CHEMISTRY

1. The condensed structural formula of butane is expressed as:
 a. CH₃-CH₂-CH₂-CH₃
 b. CH₃(CH)₂CH₃
 c. C₄H₁₀
 d. $\begin{array}{c} \text{H} & \text{H} & \text{H} \\ | & | & | \\ -\text{C} & -\text{C} & -\text{C}-\text{H} \\ | & | & | \\ \text{H} & \text{H} & \text{H} \end{array}$
2. The compounds C₆H₁₂ contain
 a. All single bonds
 b. At least one double bond
 c. At least one triple bond
 d. All double bonds
3. Choose an inorganic compound from the following options
 a. CH₄
 b. CH₄OH
 c. NaCN
 d. CH₃Cl
4. Composition of alkyl halide is carbon, hydrogen and
 a. Oxygen
 b. Nitrogen
 c. Halogen
 d. Sulphur
5. Which of the following represents an alcohol?
 a. CH₃-O-CH₃
 b. CH₃-CH₂-OH
 c. CH₃COOH
 d. CH₃-COH
6. which of the following is an Unsaturated hydrocarbon:
 a. C₃H₈
 b. C₂H₆
 c. C₃H₆
 d. CH₄
7. A ketone has a functional group:
 a. $\begin{array}{c} \text{O} \\ || \\ -\text{C}-\text{H} \end{array}$
 b. $\begin{array}{c} \text{O} \\ || \\ -\text{C}- \end{array}$
 c. $\begin{array}{c} \text{O} \\ || \\ -\text{C}-\text{OH} \end{array}$
 d. -C-O-C-
8. Formula of natural gas is
 a. CH₄
 b. C₂H₈
 c. C₂H₆
 d. C₂H₂
9. Catenation is the property of carbon to bond with other

- a. Oxygen atoms
c. Nitrogen atoms
- b. Carbon atoms
d. Halogens
10. When Oxygen is attached on both sides to carbon atom the compound is called
a. Alcohol
c. Aldehyde
- b. Ketone
d. Ether

HYDROCARBONS

- Example of a substitution reaction:
a. Halogenation of alkynes
c. Halogenation of alkanes
b. Halogenation of alkenes
d. Oxidation of alkene
- In a reaction of ethane and HBr, the product formed is
a. CH₃—CH₂—Br
c. CH₃—CH₂—CH₃
b. Br—CH₂—CH₂—Br
d. CH≡CH
- Halogenation of methane in the presence of diffused sunlight happens
a. Quickly, only in one step
c. In a series of four steps
b. Slowly, only in one step
d. Quickly, in two step
- Dehydrohalogenation of alkylhalide is a process of
a. Removal of hydrogen
c. Removal of hydrogen and halogen
b. Removal of halogen
d. Addition of hydrogen and halogen
- Which one of the following changes color of bromine water
a. Ethane
c. Propane
b. Ethene
d. Methane
- The general formula of alkane is written as
a. C_nH_{2n}
c. C_nH_{2n+2}
b. C_nH_{2nx2}
d. C_nH_{2n-2}
- Ethyl alcohol is dehydrated with conc. H₂SO₄ the product is
a. Ethane
c. Ethyne
b. Methane
d. Ethene
- Substitution reaction is the characteristic of the following
a. Alkynes
c. Alkanes
d. None of these
b. Alkenes
- Choose one that is the least reactive,
a. Ethyne
c. Ethene
d. Ethane
b. Propene
- The order of reactivity of hydrogen halides when they react with alkenes is
a. HI>HCl>HBr
c. HCl>HBr>HI
b. HI<HBr<HCl
d. HI>HBr>HCl

BIOCHEMISTRY

1. Choose a disaccharide
 - a. Glucose
 - b. Fructose
 - c. Sucrose
 - d. Starch
2. Amino acids are the basic unit that polymerizes to form
 - a. Vitamins
 - b. Carbohydrates
 - c. Protein
 - d. Lipids
3. Glycogen is a
 - a. Fats
 - b. Nucleic acids
 - c. Carbohydrates
 - d. Protein
4. Vitamin A deficiency causes
 - a. Scurvy
 - b. Rickets
 - c. Night blindness
 - d. Aging
5. The compound which is found in all living cells and serves as a centre of information and control is:
 - a. Protein
 - b. Amino acids
 - c. DNA
 - d. Glucose
6. Triglycerides are the basic units of
 - a. Protein
 - b. Carbohydrates
 - c. Lipids
 - d. Vitamins
7. Sugars are polyhydroxy derivative, derived from the following
 - a. Alkyl halides
 - b. Aldehyde
 - c. Ketone
 - d. Aldehyde and Ketone
8. Peptide linkage is present in the molecules of
 - a. Carbohydrates
 - b. Lipids
 - c. Proteins
 - d. Vitamins
9. Plants store glucose as
 - a. Amino acids
 - b. Lipids
 - c. Proteins
 - d. Starch
10. All are part of composition of DNA except
 - a. Deoxyribose sugar
 - b. Ribose sugar
 - c. Nitrogen base
 - d. Phosphate unit

ENVIRONMENTAL CHEMISTRY I:

ATMOSPHERE

- Ozone layer is present in
 - Mesosphere
 - Thermosphere
 - Stratosphere
 - Troposphere
- All contribute to air pollution except
 - NO_2
 - N_2
 - SO_2
 - SO_3
- Which one of the following contributes in global warming
 - increase in concentration of N_2
 - Increase in concentration of CO_2
 - increase in concentration of O_2
 - increase in concentration of O_3
- Acid rain has a pH of
 - 13.6
 - 10.6
 - 7.6
 - 5.6
- The region in the atmosphere with lowest temperature is
 - Troposphere
 - Stratosphere
 - Mesosphere
 - Thermosphere
- Ozone is produced when _____ react in presence of ultraviolet radiation
 - O and O
 - O_2 and O
 - O_2 and O_2
 - O_2 and O_3
- The gas(es) that react with water to produce acid rain are as follows
 - SO_2
 - NO_2
 - CO_2
 - All, SO_2 , NO_2 and CO_2
- On the basis of temperature variation, atmospheric regions can be divided into _____ regions
 - Five
 - Two
 - Three
 - Four
- The gas which provides protection from UV rays and prevents skin damage is
 - CO_2
 - N_2
 - O_3
 - O_2
- Temperature in troposphere reaches as low as _____
 - 5°C
 - -5°C
 - 56°C
 - -56°C

ENVIRONMENTAL CHEMISTRY II:

WATER

1. Water can dissolve non compounds due to:
 - a. Ionic forces
 - b. Dipole-dipole forces
 - c. Ionic-dipole forces
 - d. Hydrogen bonding
2. Hardness of water is caused by all of the given options except ____
 - a. Calcium Chloride
 - b. Calcium Bicarbonate
 - c. Magnesium Sulphahte
 - d. Sodium Chloride
3. Temporary hardness in water is caused by the following
 - a. Magnesium Sulphate
 - b. Calcium Chloride
 - c. Magnesium Chloride
 - d. Calcium Bicarbonate
4. Chlorine acts as bleaching agent in the presence of the following
 - a. HCl
 - b. H_2O
 - c. NaOH
 - d. HNO_3
5. _____ is added to remove permanent hardness
 - a. Washing Soda
 - b. Soda lime
 - c. Caustic Soda
 - d. Baking Soda
6. Most of the aquatic animals cannot survive in water if temperature increases above _____
 - a. $20^{\circ}C$
 - b. $25^{\circ}C$
 - c. $30^{\circ}C$
 - d. $35^{\circ}C$
7. Water has maximum density at
 - a. $-40^{\circ}C$
 - b. $40^{\circ}C$
 - c. $-4^{\circ}C$
 - d. $4^{\circ}C$
8. The infection of liver is also known as
 - a. Hepatitis
 - b. Cholera
 - c. Typhoid
 - d. Dysentery
9. _____ is not a waterborne disease.
 - a. Hepatitis
 - b. Cholera
 - c. Typhoid
 - d. Dysentery
10. Water gas is a mixture of the following
 - a. CO and H_2
 - b. C and H_2
 - c. CO and H_2O
 - d. C and H_2O

CHEMICAL INDUSTRIES

1. When Sodium Bicarbonate is heated to get sodium carbonate, _____ is produced.
 - a. CO
 - b. CO_2
 - c. Na_2CO_3
 - d. H_2O
2. In froth floatation process, concentration of ore is achieved by
 - a. Magnetically
 - b. Wetting the ore
 - c. Difference in density
 - d. Chemically
3. Raw materials for the manufacturing of soda are as follows except:
 - a. Ammonia
 - b. Brine
 - c. Lime stone
 - d. Carbon monoxide
4. Matte is a mixture of the following compounds
 - a. CuS and FeS
 - b. Cu_2S and FeS
 - c. Cu_2O and FeS
 - d. Cu_2O and FeO
5. The impurity present in mineral is known as
 - a. Metal
 - b. Ore
 - c. Gangue
 - d. Salt
6. All are the raw materials used in production of urea except.
 - a. CO_2
 - b. NH_3
 - c. H_2O
 - d. NaCl
7. Urea contains nitrogen _____ %
 - a. 14
 - b. 28
 - c. 60
 - d. 46
8. Refining of blister copper is carried through
 - a. Concentration
 - b. Reduction
 - c. Smelting
 - d. Electrolysis
9. Petroleum can be separated into different fractions by the process of
 - a. Simple distillation
 - b. Condensation
 - c. Fractional distillation
 - d. Destructive distillation
10. In extraction of metals except, the following process is not involved.
 - a. Roasting
 - b. Smelting
 - c. Evaporation
 - d. Bessemerization

MATHEMATICS (From Textbook)

MATRICES

1. Choose the Correct Answer in each of the following problems.

i. Which statement is true about the

$$\text{matrix: } \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$$

- A. An identity matrix w.r.t multiplication
 B. a column matrix
 C. an identity matrix w.r.t addition
 D. a row matrix

ii. Which statement is true about the

$$\text{matrix: } \begin{bmatrix} 4 & 0 \\ 0 & -12 \end{bmatrix}$$

- A. a scalar matrix
 B. 2×3 matrix
 C. a diagonal matrix
 D. None of these

iii. What will be the adjoint of a matrix A,

$$\text{when } A = \begin{bmatrix} -1 & -2 \\ 3 & 1 \end{bmatrix}?$$

- A. $\begin{bmatrix} -1 & -2 \\ 3 & 1 \end{bmatrix}$ B. $\begin{bmatrix} 1 & 2 \\ -3 & -1 \end{bmatrix}$
 C. $\begin{bmatrix} -1 & 2 \\ 3 & 1 \end{bmatrix}$ D. $\begin{bmatrix} 1 & -2 \\ 3 & 1 \end{bmatrix}$

iv. What will be the inverse of a matrix A,

$$\text{when } A = \begin{bmatrix} 2 & 3 \\ 3 & 4 \end{bmatrix}?$$

A. $\begin{bmatrix} 4 & 3 \\ -3 & 2 \end{bmatrix}$
 C. $\begin{bmatrix} -2 & 2 \\ 3 & 3 \end{bmatrix}$

B. $\begin{bmatrix} 4 & -3 \\ -3 & 2 \end{bmatrix}$
 D. $\begin{bmatrix} -4 & 3 \\ 3 & -2 \end{bmatrix}$

v. The matrix: $\begin{bmatrix} 5 & 1.5 \\ 2 & d \end{bmatrix}$ is not invertible for what value of d?

- A. -0.6 B. 0
 C. 0.6 D. 3

vi. If A and B are two matrices of dimension 2×5 , then the dimension of matrix A+B will be:

- A. 2×5 B. 10×10
 C. 7×1 D. 7×7

vii. The multiplicative inverse of the matrix:

$$\begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix} \text{ is?}$$

- A. $\begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}$ B. $\begin{bmatrix} 1 & -2 \\ 0 & 1 \end{bmatrix}$
 C. $\begin{bmatrix} -1 & 2 \\ 0 & 1 \end{bmatrix}$ D. $\begin{bmatrix} 1 & -2 \\ 0 & -1 \end{bmatrix}$

viii. Find the determinant of the following

$$\text{matrix: } \begin{bmatrix} 4 & -1 \\ -9 & 2 \end{bmatrix}$$

- A. 17 B. 1
 C. -1 D. -17

REAL AND COMPLEX NUMBERS

1. Select the correct answer.

i. What is the additive inverse of: $\sqrt{5}$?

- A. $-\sqrt{5}$ B. $\frac{1}{\sqrt{5}}$
 C. $\sqrt{-3}$ D. -5

ii. The property utilized for:

$$2(3+4) = 2 \times 3 + 2 \times 4, \text{ is:}$$

- A. Commutative B. Associative
 C. Distributive D. Closure

iii. The answer of the product: $\sqrt{-1} \times \sqrt{-1}$ is:

- A. 1 B. i
 C. -1 D. 0

iv. To represent numbers greater than -3 but less than 6, which statement should be used:

- A. $\{x: -3 > x > 6\}$ B. $\{x: -3 \leq x \leq 6\}$
 C. $\{x: -3 < x < 6\}$ D. $\{x: -3 \geq x \geq 6\}$

v. Find m, when $16 \times 2^m = 4^{n-8}$ for $n = 8$.

- A. -4 B. -2
 C. 0 D. 8

vi. The product of: (i) and (-i) is:

- A. 1 B. -1
 C. -i D. i

vii. For all Real numbers, the multiplicative identity is:

- A. 0 B. -1
 C. -1 D. R

viii. Which statement is true about 0?

- A. a positive integer
 B. a negative integer
 C. neither positive nor negative
 D. nor an integer

ix. Find x, when $3l(2+5l) = x+6l$, where $l = \sqrt{-1}$.

- A. 5 B. -15
 C. 5i D. 15i

x. The value of $\sqrt{0}$ is equal to:

- A. 0 B. 1
 C. -1 D. Not defined

xi. If $l = \sqrt{-1}$, then $\sqrt{-(-9)^2} = ?$

- A. 9 B. 9+i
 C. 9-i D. 9i

PHYSICS

PHYSICAL QUANTITIES AND MEASUREMENTS

1. The centimeters present in 100 mm of length are?
 A. 100 cm B. 200 cm
 C. 50 cm D. 10 cm
2. Micrometer can be utilized to measure the magnitude of which quantity?
 A. current B. force
 C. length D. mass
3. The inner diameter of a tube can be measured using?
 A. screw B. Vernier caliper
 C. meter rule D. measuring tape
4. The largest value can be represented using which prefix among the following?
 A. mega B. giga
 C. peta D. exa
5. The smallest value can be represented using which prefix among the following?
 A. atto B. pico
 C. nano D. femto
6. Which of the following values contain only one significant digit?
 A. 1.1 B. 6.0
 C. 7.1 D. 6×10^2
7. Which of the following values contain four significant digits?
 A. 900.8 B. 4
 C. 5174.00 D. 0.0002
8. The distance travelled by light within 1 year is about 9.460×10^{15} m, and is called light year. The significant digits present in its value are:
 A. 6 B. 2
 C. 3 D. 4
9. 0.2 mm in units of meters is
 A. 0.0002 m B. 2×10^{-4} m
 C. none D. Both A and B
10. The author of the book "KITUB UL MANAZIR" is:
 A. Yaqub Kindi B. Ibn al Haltham
 C. Al Beruni D. Jabar bin Hayan

KINEMATICS

- A vehicle is moving forward with an average speed of 20 ms^{-1} . The distance covered by it in an interval of 10s is?

A. 100 m B. 200 m
C. 150 m D. 250 m
- The velocity of a vehicle is increased uniformly from 15 ms^{-1} to 20 ms^{-1} in a time interval of 5s. The acceleration of the vehicle is:

A. 2 ms^{-2} B. 1.5 ms^{-2}
C. 1 ms^{-2} D. 2.5 ms^{-2}
- A vehicle, following a straight path with a velocity of 20 ms^{-1} , is accelerated with an acceleration of 4 ms^{-2} . The velocity of the vehicle after an interval of 2s is:

A. 28 ms^{-1} B. 16 ms^{-1}
C. 12 ms^{-1} D. 8 ms^{-1}
- A bird is flying with a constant velocity. It then starts accelerating with an acceleration of 0.3 m/s^2 for 3 s. The change in its velocity will be:

A. 0.9 m/s B. 1.5 m/s
C. 1.95 m/s D. 2.4 m/s
- A vehicle is moving backwards at a velocity of 5 m/s . It then moves in forward direction after 10s of uniform acceleration, at a velocity of 10 m/s . The vehicle's acceleration is:

A. 0.5 m/s^2 B. 0.75 m/s^2
C. 1.5 m/s^2 D. 5 m/s^2
- The speed of a body is determined by:

A. slope of distance-time graph
B. slope of Torque-time graph
C. slope of force-time graph
D. slope of acceleration-time graph
- The distance covered by a moving body can be determined by the:

A. area under the speed-time graph
B. gradient of speed-time graph
C. area under acceleration-time graph
D. slope of acceleration-time graph
- A vehicle, moving in a straight line is covering a distance of 100m every 7 seconds. The vehicle is traveling at:

A. Constant speed
B. Constant velocity
C. 10 m/s
D. Both A and B
- Two similar objects, having same shape and dimensions, are dropped from a certain height. The second object is dropped after the first one has fallen 4 meter below. Both the objects continue their free fall, their separation

- A. Increases
- B. Decreases
- C. remains the same
- D. none

DYNAMICS

1. A spherical object of mass 30 kg is tied to the ceiling with the help of a rope. The tension in the rope is equal to the weight of the object. The weight of the object will be:
 - A. 30 kg
 - B. 30 N
 - C. 294 N
 - D. 9.8 N / kg
2. The force required to stop an object of mass 0.5 kg moving with a constant acceleration of 10 ms^{-2} is:
 - A. 20 N
 - B. 10.5 N
 - C. 9.5 N
 - D. 5 N
3. Two balls A and B collide with each other. If ball B is at rest and the collision is perfectly elastic, then which of the following situation is not possible:
 - A. ball A comes to rest and ball B start moving
 - B. both balls move in same direction
 - C. both balls move in opposite directions
 - D. both balls are at rest
4. If the momentum of an object is 22000 kg m/s, and it is moving with a velocity of 20 m/s, then the mass of the object will be:
 - A. 440000 kg
 - B. 21980 kg
 - C. 22020 kg
 - D. 1100 kg
5. If an object of certain mass is taken from Earth to the moon, then the object will have:
 - A. less mass but less weight
 - B. same mass but more weight
 - C. same mass but less weight
 - D. less mass and same weight
6. Which of the following is a unit-less quantity:
 - A. Force
 - B. Tension
 - C. Friction
 - D. Coefficient of Friction
7. If an object of mass 1 kg is moving in a circle of radius 3m with the velocity of 6 m/s, then the centripetal acceleration of the object will be:
 - A. 18 ms^{-2}
 - B. 12 ms^{-2}
 - C. 10 ms^{-2}
 - D. 2 ms^{-2}
8. If the mass of a body is doubled while moving in a circle with constant speed, then the centripetal force will be:
 - A. increased 2 times
 - B. decreased 2 times

- C. increased 4 times D. decreased 4 times
9. The force(s), that can act in the same way as a centripetal force will be:
 A. tension B. friction
 C. gravitational force D. All of these
10. An object is placed in the middle of a train moving at a high speed. If the brakes of the train are applied, then the object will:
 A. slide backwards B. slide forward
 C. jumps up D. remains in the same place
11. According to the Newton's third law of motion, the action and reaction of a force are experienced by:
 A. the same body B. two different bodies
 C. a third body D. none of these

TURNING EFFECT OF FORCES

1. Counter-clockwise direction torque is conventionally considered to be:
 A. Negative B. Positive
 C. Parallel D. Zero
2. A force of 100 N is exerted on a door to open it. If the minimum torque required to open it is 80 Nm, then what will be the minimum distance between the hinges and the door handle?
 A. 0.6 m B. 1 m
 C. 0.4 m D. 0.8 m
3. If two children are sitting on two opposite ends of a seesaw and one of them leans towards the center, then that end of seesaw will:
 A. rise B. fall
 C. insufficient data D. neither rise nor fall
4. An object of arbitrary shape placed in its equilibrium position will:
 A. remain at rest B. starts moving
 C. starts rotating D. starts accelerating
5. A uniformly rotating fan has three blades of length 0.5m. if the weight of each blade is 1 kg, then the torque acting on each blade will be:
 A. 0.5 Nm B. 2 Nm
 C. -0.5 Nm D. 0 Nm
6. The torque acting on the nut of a wheel with a force of 100 N, applied perpendicular at 0.5m distance using a tool will be:
 A. 500 Nm B. 50 Nm
 C. 5 Nm D. 0 Nm
7. The perpendicular distance between the line of action of two equal but opposite parallel forces is:
 A. moment arm B. couple arm

- C. radius D. double moment
8. If a perpendicular force of 25 N is applied on a door at a distance of 0.6m from the hinge, then the torque with which the door is being opened is:
 A. 41.6 Nm B. 25.6 Nm
 C. 15 Nm D. 0 Nm
9. The horizontal and vertical components of a force are equal at what angle?
 A. 0° B. 30°
 C. 45° D. 60°
10. What will make the center of mass of an object different from its center of gravity?
 A. non uniform shape of object B. mass of object
 C. non uniform gravitational field D. none of these

GRAVITATION

1. If the masses of two objects, separated by a certain displacement, are doubled, then the force of force interaction between them becomes:
 A. 2 times B. 4 times
 C. $1/2$ times D. $1/4$ times
2. Earth's radius is:
 A. 9.8 m B. 6.67×10^{-11} m
 C. 6×10^{24} m D. 6.4×10^6 m
3. The gravitational constant "G" is represented by:
 A. N kg^2 B. $\text{N m}^2 \text{kg}^{-2}$
 C. $\text{N m}^2 \text{kg}^2$ D. $\text{N m}^{-2} \text{kg}^2$
4. An object with weight equals to 784N on Earth has a mass of ____ kg on Pluto.
 A. 80.0 kg B. 118
 C. 784 kg D. More information needed
5. A satellite is orbiting the earth with an orbital speed v at a radius r . If the mass of the satellite is increased 4 times while keeping the radius same, the orbital speed will:
 A. increases 2 times B. increases 4 times
 C. remains the same D. reduced 4 times
6. The gravitational acceleration ' g ' at the surface of moon is:
 A. 9.8 ms^{-2} B. 1.63 ms^{-2}
 C. 4.9 ms^{-2} D. 8.9 ms^{-2}
7. The gravitational acceleration ' g ' _____ with the increase in altitude.
 A. increases B. decreases
 C. gets ZERO D. remains the same
8. If an object is moved from the sea level to the top of Mount Everest, then there will be a change in the:
 A. mass of body B. weight of body
 C. none D. both mass and weight of body

9. The value of 'g' at equator is
 A. Same at poles B. Larger at poles
 C. Smaller at poles D. None

WORK AND ENERGY

Choose the best possible answer:

- If the angle between the force and displacement is _____, then the work done will be zero.
 A. 30° B. 45°
 C. 60° D. 90°
- If a force of 30 N force is experienced by an object and it moves a distance of 5 in the direction same as that of the force, then the work done is:
 A. 6 J B. 25J
 C. 150J D. 0.17N
- If the velocity of an object is reduced to half of its initial value, then the kinetic energy of the object:
 A. increases 4 times B. increases 2 times
 C. becomes $1/2$ D. becomes $1/4$
- If a body weighing 10kg is lifted to a height of 5 m, then the energy gained by the body is:
 A. 0.5 J B. 2 J
 C. 50J D. 490J
- The efficiency of an engine that consumes 100 J of energy to do 20 J of useful work will be:
 A. 80% B. 60%
 C. 40% D. 20%
- Electricity consumption is measured in kwh, which is a unit of:
 A. Energy B. Power
 C. Efficiency D. None
- An engine power rating of 1 hp is equivalent to:
 A. 476W B. 550W
 C. 746W D. 1 ft.lb/s
- A person weighing 500 N reaches the hill top in 90s. If the height of the hill is 18m, then the power utilized by the person to reach hill top is:
 A. 2500 W B. 100 W
 C. 980 W D. 3.24 W
- A crane lifts an object of mass 20.4 kg to a height of 30 m. If the crane took 30 s to do the task, its average power will be:
 A. 1.33 W B. 200 W
 C. 120W D. 6000W

PROPERTIES OF MATTER

Choose the best possible answer:

1. A liquid of density 30 kgm^{-3} has completely filled a container of volume 6 m^3 . The liquid's mass will be:

A. 180kg	B. 24kg
C. 5kg	D. 0.2kg
2. Fluids includes:

A. Liquids	B. Solids
C. Gasses	D. Both liquids and gasses
3. Which if the following is not the unit of pressure?

A. Atm	B. Pa
C. bar	D. kgm^{-3}
4. As you go down the ocean vertically, the pressure

A. Increases	B. Decreases
C. none	D. stays the same
5. In weather maps, the pressure is written in:

A. Atm	B. Pa
C. Bar	D. Nm^2
6. The weight of a rock on land is 25.7 N and inside a water body, it weighs 21.8 N . The buoyant force exerted by the water is:

A. 4.1 N	B. 3.9 N
C. 1.18 N	D. 0.84 N
7. The largest buoyant force will be experienced by which of the following objects when placed inside water?

A. 1-kg helium balloon	B. 1 kg of wood;
C. 1 kg of Iron	D. all the same.
8. The S.I. unit of strain:

A. kgm^{-3}	B. Pa
C. Nm^2	D. unit-less
9. Young modulus can be measured in:

A. kg m^3	B. Pa
C. N	D. Unit-less

TRANSFER OF HEAT

Choose the best possible answer:

1. Among the following metals, which one is the best heat conductor?
A. aluminum B. Tin
C. iron D. **Copper**
2. Identical cubes of the following materials are kept in a room at the same temperature. Which will feel coldest by touching them?
A. Wood B. Glass
C. **Iron** D. Styrofoam
3. As per the process of convection, the smallest heat transfer can be observed in;
A. **solids** B. Liquids
C. gases D. none
4. Heat transfer that occurs due the flow of blood in vessels happens according to the process of:
A. **convection** B. Conduction
C. radiation D. None
5. Which of the following colored surface will absorb the maximum heat?
a. White B. Grey
C. **Dull black** D. Highly polished
6. The process of heat transfer that do not require any, material medium:
A. convection B. conduction
C. **radiation** D. none
7. Among the following substances, the highest thermal conductivity can be observed in:
A. **water** B. Wood
C. wool D. Air
8. At which temperature, a body ceases to emit any sort of radiation?
A. **0°C** B. 0°F
C. OK D. All of these
9. _____ move freely through the metal?
A. lose electrons B. **Free electrons**
C. conduction electrons D. Holes

SIMPLE HARMONIC MOTION AND WAVES

1. The total distance covered by a spot present on a transverse wave having an amplitude A , in 1 cycle is:

a. A	b. $2A$
c. $\frac{1}{2}A$	d. <u>$4A$</u>
2. The time period of the mass-spring system does not depend on which one of the following?

a. mass	b. spring constant
c. <u>amplitude of vibration</u>	
d. All of the above affect the period.	
3. Consider an object of mass ' m ' tied to one end of a spring. What should be the change in the value of m , if the time period is required to be doubled?

a. $2m$	b. $m/2$
c. <u>$4m$</u>	d. $m/4$
4. Consider an object of mass ' m ' tied to one end of a spring. If the mass m suddenly increases, the frequency of oscillation will?

a. increase	b. <u>decrease</u>
c. stay the same	d. be zero
5. The frequency of a pendulum that completes 12 cycles within 2 minutes is?

a. <u>0.10Hz</u>	b. 0.17Hz
c. 6.0 Hz	d. 10Hz
6. A pendulum has an iron bob tied to its one end. If it is replaced by a heavier lead bob of same size and shape, then the time period will:

a. <u>stay the same</u>	b. decrease
c. increase	d. be zero
7. A wave transfers

a. <u>energy but not matter</u>	b. matter but not energy
c. both energy and matter	d. air
8. _____ is the phenomenon of bending of waves about the corners of an obstacle.

a. reflection	b. refraction
c. <u>diffraction</u>	d. damping

SOUND

1. If the intensity of a sound wave is increased by 1000 w/m^2 then the increase in decibels will be:

a. 10	b. 20
c. <u>30</u>	d. 40
2. Echo of a sound is observed when the sound is _____.

a. absorbed	b. transmitted
c. refracted	d. <u>reflected</u>
3. The intensity of a 80 decibels sound as compared to a 60 decibels sound is _____ times greater.

a. 10	b. <u>100</u>
c. 1000	d. 10000
4. _____ of a sound wave determines its loudness.

a. Frequency	b. Period
c. Wavelength	d. <u>Amplitude</u>
5. _____ of a musical instrument affects the sound of the same note when played through various instruments.

a. pitch	b. loudness
c. <u>quality</u>	d. intensity
6. The audible frequency range for humans is:

a. less than 20 Hz	b. <u>between 20Hz and 20kHz</u>
c. greater than 20 kHz	d. None
7. At a temperature of about 38°C , the speed of sound is:

a. <u>331 m/s</u>	b. 345 m/s
c. 354 m/s	d. 362 m/s
8. The minimum echo distance of a sound wave is further reduced in

a. summer	b. <u>winter</u>
c. spring	d. space
9. Sound waves cannot be transmitted inside:

a. solid	b. liquid
c. gas	d. <u>vacuum</u>

GEOMETRICAL OPTICS

- The angle of reflection of a reflected wave, when the angle of incidence is 30° , is:
 - 30°
 - 45°
 - 90°
 - 210°
- If ' r ' = radius of curvature for a concave mirror, then real diminished image of an object is formed at:
 - $d_o > r$
 - $d_o = r$
 - $r > d_o > f$
 - $d_o = f$
- If the radius of curvature of a convex mirror is 10cm, the focal length will be:
 - +10cm
 - +5cm
 - 10cm
 - 5cm
- The image of an object formed when it is placed at a distance of 7cm from concave mirror with radius of curvature = 10cm:
 - real and upright
 - virtual and upright
 - real and inverted
 - virtual and inverted
- The maximum refraction of light can be observed in which of the following mediums:
 - water
 - glass
 - air
 - diamond
- The power of a convex lense with $f = 8.00$ cm is:
 - 2.05 D
 - 4.00 D
 - 12.5D
 - 16.0 D
- What type of objects will be difficult to observe by a human eye when its lens to retina distance is shorter in comparison with the normal eye?
 - nearby
 - colorful
 - far away
 - moving fast
- If the near point of a person is located at a distance of _____, then he will benefit if utilizes a magnifying glass.
 - 75cm
 - 50 cm
 - 35 cm
 - 25 cm
- For a human eye, the image is formed at
 - iris
 - retina
 - pupil
 - cornea

ELECTROSTATICS

1. During combing of hair, some of electrons from hair are shifted on the comb's surface, making the charge on our hair:

a. <u>positive</u>	b. negative
c. zero	d. infinite
2. Electric charge is measured in:

a. farad	b. <u>coulomb</u>
c. volt	d. electron volt
3. Two identically sized spheres A and B have a charge of $-50e$ and $+20e$. If the spheres are made up of conductive material and their surfaces touch each other, then the resultant charge on sphere A will be:

a. $+15e$	b. <u>$-15e$</u>
c. $+35e$	d. $-35e$
4. What will be the resultant coulomb force when the distance between two charged particles is halved?

a. half	b. one quarter
c. double	d. <u>four times</u>
5. The Coulomb's constant depends on:

a. value of charges	b. <u>material medium</u>
c. separation between charges	d. all of these
6. If a capacitor is connected to a group of capacitors in series, the equivalent capacitance will:

a. increase	b. stay the same
c. <u>decrease</u>	d. goes to zero
7. Electric potential is measured in:

a. farad	b. coulomb
c. <u>volt</u>	d. NC^{-1}
8. If four capacitors of $1\mu F$ capacitance are connected together, then what will be the least value of equivalent capacitance achieved by their combination?

a. $4\mu F$	b. $1\mu F$
c. <u>$1/4\mu F$</u>	d. $1/8\mu F$
9. The actual amount of charge present on the two plates of a capacitor when a total Q charge is stored on the capacitor:

a. Q, Q	b. $Q, 0$
c. <u>$Q, -Q$</u>	d. $Q/2, -Q/2$

1. Ampere-hour, a unit used to rate the batteries, is actually a unit of:
a. charge b. current
c. power d. energy
2. A light bulb glows when connected to a battery. If the battery terminals are reversed, the bulb will glow:
a. brighter b. dimmer
c. with the same brightness d. and fuse
3. To decrease the resistance of a wire, what should be increased:
a. temperature b. length
c. diameter d. both A & B
4. Electrical conductors can be made using:
a. glass b. rubber
c. silver d. silk
5. If the direction of current is reversed after regular interval of time, then it is called:
a. DC b. AC
c. conventional current d. both A and B
6. Electricity consumption is measured in kilowatt-hour, which is a unit of
a. charge b. current
c. power d. energy
7. To protect a circuit against overload currents, which device should be used?
a. heater b. fuse
c. lamp d. All of these
8. One ohm of resistance is equivalent to:
a. $1VA^{-1}$ b. $1JS^{-1}$
c. $1WA^{-1}$ d. $1JC^{-1}$
9. If two parallel connected resistances have 1 ohm resistance each, the equivalent resistance will be:
a. 2Ω b. 1.5Ω
c. 1Ω d. 0.5Ω
10. 1kilo Watt hours of energy is equivalent to
a. 3600W b. 1000J
c. $3.6 \times 10^6 J$ d. 0.36 hrs

ELECTROMAGNETISM

1. What is the direction of magnetic field, when a current flowing in northward direction in a current carrying wire, which is deflected towards east by the magnetic force?

a. <u>straight up</u>	b. straight down
c. south	d. west.
2. The unit Tesla (T) is equivalent to:

a. Nm/A	b. NA/m
c. <u>N/Am</u>	d. Am/N
3. Inductance is measured in Henry (H), which is equivalent to:

a. <u>Vs/A</u>	b. VA/m
c. As/V	d. V/A
4. If the speed of motion of a magnet through a coil is increased, the induced e.m.f will:

a. <u>increase</u>	b. remains the same
c. decrease	d. goes to 0
5. To transfer power, slip rings are used in

a. DC motor	b. <u>AC generator</u>
c. transformer	d. electromagnet
6. A transformer steps up or steps down _____.

a. both DC and AC	b. <u>AC voltages</u>
c. DC voltages	d. frequency
7. The secondary _____ of a step up transformer is greater in comparison to the primary side.

a. power	b. energy
c. <u>voltage</u>	d. current
8. The turns ratio of a transformer with 500 turns of primary winding and 250 turns of secondary winding is:

a. 0.5	b. <u>2</u>
c. 250	d. 750
9. A transformer having a turns ratio of 5, will have the secondary voltage greater than the primary side by:

a. 0.2	b. <u>0.5</u>
c. 2.5	d. 5

INTRODUCTORY ELECTRONICS

- Cathode rays are made up of:
 - protons
 - electrons
 - ions
 - neutrons
- The electrons will _____ if they pass through an electric field applied parallel to their direction of motion.
 - speed up
 - slow down
 - deflect
 - not change its state
- The electrons will _____ when they pass through a magnetic field applied parallel to their direction of motion.
 - speed up
 - slow down
 - deflect
 - not change its state
- If both the inputs of _____ gate are high (1), the output will be high (1) as well.
 - AND
 - OR
 - NAND
 - Both AND and OR
- If one or more inputs of a logic gate is high, its output will be high. The gate is:
 - AND
 - OR
 - NAND
 - NOR
- If all the inputs of a gate circuit are high, its output is low. The gate is:
 - NAND
 - NOR
 - NAND
 - Both NAND and NOR
- The electronic circuit that gives low (0) output when one or more of its input are high (1) is called _____ gate.
 - AND
 - OR
 - NAND
 - NOR
- The OR gate can be represented in Boolean expression as:
 - $X = AB$
 - $X = A + B$
 - $X = \overline{AB}$
 - $X = \overline{A + B}$
- The NAND gate can be represented in Boolean expression as:
 - $X = AB$
 - $X = A + B$
 - $X = \overline{AB}$
 - $X = \overline{A + B}$

INFORMATION AND COMMUNICATION TECHNOLOGY

1. The integral components of an information and communication system includes humans, hardware, software, procedures and _____.
 - a. computers
 - b. fields
 - c. data/information
 - d. signals
2. _____ is the electric or electromagnetic representations of data.
 - a. computer
 - b. signal
 - c. transmission
 - d. software
3. _____ utilizes the principle of total internal reflection to transmit signal through it.
 - a. electric wires
 - b. optical fibers
 - c. electromagnetic waves
 - d. radio
4. _____ is an electric conductor that radiates/transmits and receive a signal in the form of electromagnetic energy.
 - a. antenna
 - b. satellite
 - c. repeater
 - d. signal
5. _____ is a software used to interact with a computer system.
 - a. hardware
 - b. application
 - c. operating system
 - d. program
6. The data storing device which, do not have or require any moving part to store or retrieve information is:
 - a. CD/DVD
 - b. Hard Drive
 - c. Flash drive
 - d. Floppy
7. The data storing device that is obsolete and is least used nowadays is:
 - a. CD/DVD
 - b. Hard Drive
 - c. Flash drive
 - d. Floppy
8. Which type of transmission system/medium is involved in Telephone communication system?
 - a. electric wires
 - b. optical fibres
 - c. electromagnetic waves
 - d. All

NUCLEAR PHYSICS

- Neutrons present inside a Plutonium atom ${}^{242}_{92}\text{Pu}$ are:
 - 92
 - 142
 - 150
 - 242
- Decay of which particle(s) result in the formation of a new element?
 - Only α
 - Only β
 - Only γ
 - α and β
- The decay that do not change the electron or proton number of an atom is:
 - alpha decay
 - beta decay
 - gamma decay
 - both A & B
- The greatest change in mass and charge occurs as a result of _____.
 - alpha decay
 - beta decay
 - gamma decay
 - both B & C
- α -decay changes the ${}^{214}_{84}\text{Po}$ atom into a daughter nucleus, which itself is disintegrated due to β -decay to produce:
 - ${}^{211}_{82}\text{Pb}$
 - ${}^{215}_{80}\text{Hg}$
 - ${}^{213}_{81}\text{Tl}$
 - ${}^{212}_{83}\text{Bi}$
- An alpha particle decay from Radium-226 results in the formation of:
 - Rd
 - Rn
 - Bi
 - Pb
- The half-life of ${}^{39}\text{Ar}$ is 269 yr. Half of the ${}^{39}\text{Ar}$ atoms present in a sample will decay in:
 - 134.5 min
 - 134.5 Years
 - 269 min
 - 269 Years
- After how many half-lives, a sample of 1000 radioactive atoms will have 250 undecayed atoms remaining?
 - 0.25
 - 1.5
 - 2.0
 - 2.5
- The source of energy of Sun and other stars is:
 - fission reaction
 - fusion reaction
 - Carbon dating
 - radioactivity

BIOLOGY

INTRODUCTION TO BIOLOGY

A. Encircle the best suitable answers.

1. The person who analyzes the heart of the animal by dissecting the animal is called
A. Cell biologist
B. Histologist
C. Microbiologist
D. None of the above
2. The book Al-Qanun-fil-Tibb is written by:
A. Bu All sina
B. Jabir Bin Hayyan
C. Abdul Malik Aasmai
D. Ibn Nafees
3. Which of the following is not a multicellular organism?
A. Frog
B. Volvox
C. mushroom
D. Chlamydomonas
4. Mushroom's belong to Kingdom
A. Plantae
B. Fungi
C. Animalia
D. Protista
5. Human heart is a/an
A. Organ
B. Tissue
C. Organism
D. Organelle
6. Which of the following is not a macromolecule?
A. Glucose
B. Sucrose
C. Fatty acid
D. Protein
7. The number of plants in desert are scarce this could be the statement of:
A. Palaeontologist
B. Social biologist
C. Biogeographic
D. Taxonomist
8. Most of the organism's body is composed of
A. Hydrogen
B. Carbon
C. Oxygen
D. nitrogen
9. Volvox is
A. Unicellular
B. Multicellular
C. Bi-cellular
D. Colonial

SOLVING A BIOLOGICAL PROBLEMS

A. Encircle the best suitable answers.

1. The biological method starts with
A. Hypothesis B. Experiment
C. **Observation** D. Deduction
2. How can you determine that the plasmodium has destroyed the RBC?
A. Examine the blood of a single healthy person
B. Examine the blood of a single infected person
C. Allow mosquito to bite a healthy person and examine his blood
D. **Examine the blood of some healthy and also some infected person**
3. The data collected from the experiments can be analyzed by
A. Reading the data and drawing conclusions
B. Discussion with scientists
C. Simple calculations on calculator
D. **Application of statistical formulae**
4. How smoke reduces the chance of getting malaria?
A. Smoke kills plasmodium in their blood
B. Fire increases temperature and plasmodia are killed in air
C. **Mosquitoes cannot tolerate smoke and are repelled**
D. Smoke kills Plasmodium present in mosquitoes
5. Which of the following does not explain hypothesis?
A. It must be consistent with all available data
B. It must be testable
C. **It must be correct**
D. Must make deductions
6. Deductions are derived from
A. Observations
B. Hypothesis
C. **Experiment result**
D. Solution of biological problem
7. The statement of hypothesis is
A. Logical
B. Possible answer
C. based upon observations
D. **All of them**

8. _____ explains the actual solution to the problem.
 A. Observations B. Hypothesis
 C. Data D. Conclusion
9. Plasmodium is transmitted to humans through
 A. **Anopheles** B. Culex
 C. Aedes D. All of these
10. Who was the first one to detect plasmodium in the blood of patient suffering from malaria?
 A. Ronald Ross B. **Laveran**
 C. A. F. A. king D. Mendel

BIODIVERSITY

A. Encircle the best suitable answers.

1. What is the characteristic which makes viruses living organisms?
 A. They can be crystallized
 B. They cannot live outside host body
 C. **They contain DNA or RNA**
 D. All of the above
2. Euglena belongs to the kingdom Protista because:
 A. It is Unicellular
 B. It is Eukaryotic
 C. **It has both plant and animal-like characters**
 D. It lives in water
3. The correct order of biological hierarchy of organization is:
 A. **Species** **genus** **family** **order** B. **Family** **order** **class** **genus**
 C. Genus family class order
 D. Species family genus class
4. _____ includes organisms that are eukaryotic as well as autotrophic.
 A. **Protista** B. Monera
 C. Fungi D. None of them
5. The five-kingdom system of classification was proposed by:
 A. **Robert Whittaker**
 B. Margulis and Schwartz
 C. Carolus Linnaeus

- D. Aristotle
6. Classification system of organisms introduced by Aristotle was based on
A. Habitats B. Cell structure
C. Morphology D. Anatomy
7. _____ kingdom includes simplest organisms.
A. Fungi B. Monera
C. Protista D. Plantae
8. How would you explain binomial nomenclature?
A. Classifying organisms on seven levels
B. Naming system developed by Aristotle
C. Grouping animals based on their habitat
D. Naming system in which each organism is given a two-part name
9. The correct format of scientific name is
A. Canis lupus B. Saccharum
C. Giant's gazelle
D. Escherichia coli
10. Organisms that have cell wall but lack chlorophyll are
A. Protista B. Fungi
C. Plantae D. Animalia
11. A group of genus forms:
A. Genus B. Species
C. Family D. Order
12. _____ habitat shows maximum biodiversity
A. Forests B. Grasslands
C. Deserts D. Mountains

CELLS AND TISSUES

A. Encircle the best suitable answers.

1. Cell theory, proposed by Schleiden and Schwann, was based on
 - A. Their observation
 - B. Observations of Hooke and Brown
 - C. **All observations on the cell**
 - D. Observation made on the nucleus of the cell

2. Energy is provided to the cell by:
 - A. Golgi apparatus
 - B. Ribosome
 - C. **Mitochondria**
 - D. Nucleus

3. 2D images can be obtained through:
 - A. Light microscope and SEM
 - B. SEM and TEM
 - C. **Light Microscope and TEM**
 - D. Light microscope

4. The granular material residing inside the nucleus is called:
 - A. Cytoplasm
 - B. Protoplasm
 - C. **Nucleoplasm**
 - D. Cell sap

5. Protein synthesis is carried out in
 - A. **Ribosome**
 - B. Vacuole
 - C. Golgi apparatus
 - D. Plastids

6. Which of the following is the characteristic of nervous tissue:
 - A. Contract and relax
 - B. **Transmit the impulses**
 - C. Prepare secretion
 - D. Provide energy

7. Tissues that make new cells in plants:
 - A. **Meristematic tissue**
 - B. Collenchyma tissue
 - C. Epidermal tissue

8. _____ transport involves the expenditure of energy and molecules move from lower to higher concentration:
- A. Diffusion
 - B. Active transport**
 - C. Facilitated transport
 - D. Osmosis
9. Which of the following cells have cytoplasm as well as the cell wall?
- A. Muscle cell B. Red blood cell
 - C. Root hair cell** D. Xylem vessel
10. Composition of cell membrane is:
- A. Cellulose only
 - B. Proteins only
 - C. Lipids only
 - D. Lipids and proteins**
11. Which of the following organisms have cell wall in their cells?
- A. Fungi only B. Plants only
 - C. Plants and prokaryotes only
 - D. All of the above**
12. Which of the following organelles have a double membrane?
- A. Ribosomes B. Vacuoles
 - C. Centrioles **D. Mitochondria**

CELL CYCLE

A. Encircle the best suitable answers.

1. Which of the following statements does not describe meiosis?
- A. There is no DNA synthesis between the divisions
 - B. The result is four cells with haploid number of chromosomes
 - C. Meiosis does not contribute to the genetic diversity in populations**
 - D. Fusion of two products of meiosis produces a zygote
2. The number of chromosomes in egg cells is _____ if $2n = 8$ for any cell in the body.
- A. 12 B. 10
 - C. 8 D. 4
3. Chromosomes have lowest amount of DNA in:
- A. Prophase-I** B. Prophase-II
 - C. Telophase-I D. Telophase-II

4. Which of the following statements is correct?
- A. Meiosis produces 4 haploid cells while mitosis produces 2 diploid cells.
 - B. Meiosis produces 4 diploid cells while mitosis produces 2 haploid cells
 - C. Meiosis maintains the number of chromosomes, while mitosis reduces it.
 - D. Prophase-I of mitosis results in the formation of a tetrad but not in prophase-I of meiosis-I
5. Crossing over occurs in:
- A. Prophase-I
 - B. Metaphase-I
 - C. Metaphase-II
 - D. Anaphase-I
6. Which of the following events is not the part of mitosis but takes place in meiosis?
- A. The Chromatids of each chromosome are separated.
 - B. Synapsis and crossing-over occurs.
 - C. The nuclear envelope breaks down.
7. Which of the following organs produce cells through meiosis?
- A. Testes
 - B. Lungs
 - C. Heart
 - D. Stomach
8. _____ has two sister chromatids.
- A. Chromosome
 - B. Centromere
 - C. Multichromatid
 - D. Homologous pair
9. The cell divides during regeneration through:
- A. Only 1st meiotic division
 - B. Both meiotic divisions
 - C. Mitosis
 - D. All of them
10. Homologous chromosomes:
- A. Are identical
 - B. Pair-up during meiosis
 - C. One partner of homologous pair move to each daughter cell
 - D. All of them

ENZYMES

A. Encircle the best suitable answers.

1. Enzymes are:
a. Carbohydrates b. Fats
c. **Proteins** d. Starch
2. Which of the following correctly explains the function of enzymes?
a. Allow new chemical reactions to occur.
b. Are used up during chemical reactions.
c. Alter the direction of chemical reactions.
d. **Alter the rate of chemical reactions.**
3. Which of the following describe the enzyme?
a. All parts of enzyme molecule take part in reaction
b. **Enzymes lower the activation energy of reaction**
c. An enzyme can act upon any kind of substrates .
d. They are needed in large quantities
4. Which of the following describe the cofactors?
a. Take part in reactions b. **Help enzymes in their activity**
c. Increase activation energy d. Are composed of proteins
5. The coenzymes are:
a) Proteins b) Carbohydrates
c) **Vitamins** d) DNA
6. How does the change in temperature beyond the optimum temperature affect the enzyme or reaction?
a. Increase the rate of reaction b. **Decrease the rate of reaction**
c. Not affect the rate of reaction d. Denature the enzyme
7. The pH at which the enzyme Trypsin works best is:
a. alkaline pH b. acidic pH
c. **neutral pH** d. pH does not affect its activity
8. Enzymes are affected by environmental changes, which ultimately affects:
a. Metabolism b. Respiration
c. Digestion d. **All of them**
9. The high temperature of body is dangerous because:
a. Nerves breakdown
b. Boiling of body water
c. **Enzymes stop to work**
d. None of them

BIO-ENERGETICS

A. Encircle the best suitable answers.

1. Dark reaction occurs in:
 - a. Mitochondria
 - b. Ribosome
 - c. Granum of chloroplast
 - d. **Stroma of chloroplast**
2. _____ trap light energy and make use of it to produce carbohydrate.
 - a. Plants
 - b. Algae
 - c. **Photosynthetic organisms**
 - d. Fungi
3. Site of photosynthesis is:
 - a. **Mesophyll cells**
 - b. Guard cells
 - c. Phloem cells
 - d. All of the above
4. _____ controls photosynthesis by acting as a limiting factor for enzymes.
 - a. CO₂ concentration
 - b. **Temperature**
 - c. Light intensity
 - d. Pigments
5. The colors that are important for photosynthesis are:
 - a. Green and yellow
 - b. **Yellow and orange**
 - c. Green and orange
 - d. Red and blue
6. Which of the following substances can never be used for respiration?
 - a. Oxygen
 - b. Food molecule
 - c. Enzymes
 - d. **CO₂**
7. The central substance in the ATP structure to which three phosphate groups are attached, is:
 - a. Ribose
 - b. Glucose
 - c. **Adenine**
 - d. H₂O
8. _____ acts as fuel used by the living cells to carry out functions:
 - a. Electric power
 - b. Generator
 - c. **ATP**
 - d. Heat energy
9. Site of glycolysis in bacterial cell is:
 - a. Mesosome
 - b. **Cytoplasm**
 - c. Mitochondria
 - d. Nucleoid
10. Which molecules are used up during the anaerobic respiration when pyruvic acid is converted to ethanol?
 - a. **one NADH₂**
 - b. one NADH₂ and CO₂
 - c. two NADH₂
 - d. only CO₂

NUTRITION

1. Deficiency of _____ results in chlorosis in plants.
a. Iron b. Oxygen
c. Nitrogen d. Calcium
2. All of these are micronutrients in plants except:
a. Hydrogen b. Iron
c. Chlorine d. Copper
3. Plants use _____ for protein synthesis.
a. Carbon dioxide b. Oxygen
c. Nitrates d. Vitamins
4. What happens to the food in the stomach?
a. No digestion occurs in the stomach.
b. The food moves quickly into the small intestine.
c. **Juices mix with the food and stomach muscles squeeze it.**
d. The food is completely digested and is absorbed into the circulatory system.
5. _____ does not produce digestive juices.
a. Esophagus b. Stomach
c. Pancreas d. Intestine
6. The absorption of _____ takes place in large intestine:
a. Water b. Vitamins
c. Salts d. **All of these**
7. Saliva does not:
a. **Start digestion of proteins** b. Help in the lubrication
c. Secrete saliva d. Make taste possible
8. The valve between _____ is called the cardiac sphincter:
a. Stomach and duodenum
b. **Esophagus and stomach**
c. Duodenum and ileum
d. Jejunum and caecum
9. Liver is involved in :
a. Metabolism of carbohydrates, lipids, and proteins
b. Breakdown of mature red blood cells.
c. Detoxification of the chemicals
d. **All of the above**
10. Pepsin is involved in the digestion of:
a. Carbohydrates b. **Proteins**
c. Fats d. Vitamins

TRANSPORT

A. Encircle the best suitable answers.

1. Platelets forming cells are called:
a. Erythrocytes b. Leucocytes
c. Bone marrow cells d. All of these
2. Blood group O can be transfused to:
a. A b. B
c. AB d. All of the these
3. _____ chamber of human heart has thickest wall
a. Right atrium b. Left atrium
c. Left ventricle d. Right ventricle
4. The diffusion of blood into the tissues is carried out through:
a. Arteries b. Veins
c. Capillaries d. Arteries and veins
5. All of the following veins carry deoxygenated blood except:
a. Vena cava b. Hepatic portal
c. Pulmonary d. Renal
6. Which cells of blood are responsible for clotting?
a. Platelets b. Erythrocytes
c. Neutrophils d. Basophils
7. A patient with blood group A can be given the blood of group;
a. A or AB b. A or O
c. A only d. O Only
8. The blockage of blood flow in _____ results in Myocardial infarction.
a. Aorta b. Pulmonary artery
c. Coronary artery d. Hepatic artery

HOMEOSTASIS

A. Select the correct answer.

1. The maintenance of the internal environment of the organism is carried out through
 - a. Fluids regulation
 - b. Excretion of wastes
 - c. Temperature regulation
 - d. All of the above
2. Xerophytes adapt themselves to survive in severe conditions by developing these conditions except
 - a. Thick cuticle
 - b. Large number of stomata
 - c. Sunken stomata
 - d. Deep root system
3. The water is lost from the plants in the form of small droplets from small pores is called _____.
 - a. Stomatal transpiration
 - b. Cuticular transpiration
 - c. Lenticular transpiration
 - d. Guttation
4. Waste fluid leaves the nephron to enter
 - a. Collecting tubules
 - b. Ureter
 - c. Convoluted tubules
 - d. Medulla
5. Urine travels from kidney to urinary bladder through
 - a. Ureter
 - b. Urethra
 - c. Renal tubule
 - d. Nephron
6. Kidney produces waste material consisting of
 - a. Water, proteins, and salts
 - b. Salts, water, and vitamins
 - c. Urea and water
 - d. Urea, water, and salts
7. Skin produces sweat which makes it a
 - a. Respiratory organ
 - b. Breathing organ
 - c. Excretory organ
 - d. Digestive organ
8. Functions of sweat include:
 - a. Keep the body cool and to remove excess proteins
 - b. Keep the body warm and to filter the blood
 - c. Filter the blood and to remove waste products
 - d. Remove waste products and to cool the body
9. The filtrate that enters the Bowman's capsule does NOT contain:
 - a. Water
 - b. Calcium ions
 - c. Blood cells
 - d. Urea
10. Liver is involved in urea production from:
 - a. Uric acid
 - b. Ammonia
 - c. Carbon dioxide
 - d. Amino acids

COORDINATION AND CONTROL

A. Select the correct answer.

1. Insulin is a hormone and is secreted by;
 - a. Liver
 - b. Pancreas
 - c. Stomach
 - d. Kidney
3. _____ carries signals towards the neuron cell body.
 - a. Axon
 - b. Dendrite
 - c. Schwann cell
 - d. Myelin sheath
4. _____ detects the changes in the environment.
 - a. Receptors
 - b. Neurons
 - c. Effectors
 - d. All of them
5. Cerebral cortex:
 - a. Is located deep in the brain.
 - b. Is the folded outer covering of the brain.
 - c. Is located at the back of the brain.
 - d. Is part of the peripheral nervous system.
6. The condition in which the light rays are focused behind the retina is called:
 - a. Myopia
 - b. Hypermetropia
 - c. Short sightedness
 - d. Normal vision
7. Neuron endings have microscopic gaps called:
 - a. Transmitters
 - b. Synapses
 - c. Pores
 - d. Nodes
8. _____ is the biggest part of the brain.
 - a. Cerebrum
 - b. Cerebellum
 - c. Amygdala
 - d. Frontal lobe
9. Intelligence is controlled by:
 - a. Cerebrum
 - b. Cerebellum
 - c. Thalamus
 - d. Hypothalamus
10. Composition of mixed nerves:
 - a. Axons of sensory and motor neuron
 - b. Cell bodies of sensory and motor neurons
 - c. Axons of inter-neurons
 - d. Cell bodies of inter-neurons
11. Memory is controlled by:
 - a. Cerebellum
 - b. Limbic system
 - c. Hippocampus
 - d. Hypothalamus
12. Which of the following is both endocrine and exocrine gland?
 - a. Pituitary
 - b. Thyroid
 - c. Adrenal
 - d. Pancreas
13. Pressure waves are produced through the vibration in _____ part of inner ear.
 - a. Cochlea
 - b. Both 'a' and 'b'

c. Auditory nerve

d. Semi-circular canals

SUPPORT AND MOVEMENT

A. Select the correct answer.

1. Appendicular skeleton consists of
 - a. Pelvic girdle
 - b. Limbs
 - c. Pectoral girdle
 - d. All of the above
2. Vertebrae are connected through
 - a. Fixed joint
 - b. Slightly moveable joint
 - c. Ball-and-socket joint
 - d. Hinge joint
3. Axial skeleton does not include
 - a. Sternum
 - b. Vertebrae
 - c. Leg bones
 - d. Skull
4. Bones have _____ which make them stronger than the cartilage
 - a. Collagen fibres
 - b. Osteocytes
 - c. Calcium phosphate
 - d. Lacunae
5. _____ is the protein of cartilage matrix.
 - a. Collagen
 - b. Osteo-nectin
 - c. Keratin
 - d. Actin
6. Two bones at a joint are connected through
 - a. Ligament
 - b. Tendon
 - c. Cartilage
 - d. Marrow
7. Bones become weak and brittle in _____.
 - a. Osteoporosis
 - b. Osteoarthritis
 - c. Rheumatoid arthritis
 - d. Vertebral column
8. _____ is the spot where the muscle gets attached to the bone.
 - a. Tendon
 - b. Ligament
 - c. Insertion
 - d. Origin
9. _____ is inflammation in joints.
 - a. Arthritis
 - b. Osteoporosis
 - c. Rickets
 - d. All of the above

REPRODUCTION

- A. Select the correct answer.
1. Genetic variations are obtained through
 - a. Sexual reproduction
 - b. Asexual reproduction
 - c. Mitosis
 - d. Large number of organisms
 2. Mode of reproduction of hydra is: A Hydra reproduces asexually by;
 - a. Spore formation
 - b. Multiple fission
 - c. Budding
 - d. Binary fission
 3. Artificial vegetative propagation of plants is carried out through
 - a. Grafting
 - b. Spore formation
 - c. Budding
 - d. Binary fission
 4. Parthenogenesis gives rise to a new individual from:
 - a. Sperm
 - b. Fertilized egg
 - c. Unfertilized egg
 - d. Common body cell
 5. The embryo sac is present in the _____ part of a flower.
 - a. Anther
 - b. Filament
 - c. Ovule
 - d. Style
 6. Male and female gametes unite to undergo _____.
 - a. Fertilization
 - b. Oogenesis
 - c. Spermatogenesis
 - d. Gametogenesis
 7. The single cell which gives rise to an individual after series of mitotic divisions is called:
 - a. Egg
 - b. Sperm
 - c. Zygote
 - d. Blood cell
 8. _____ results in diploid number of chromosomes.
 - a. Ovulation
 - b. Oogenesis
 - c. Fertilization
 - d. Spermatogenesis
 9. Which of the following shows external fertilization?
 - a. Fish and amphibians
 - b. Reptiles
 - c. Birds
 - d. Mammals
 10. Which of the following shows internal fertilization?
 - a. Fish
 - b. Amphibians
 - c. Aquatic animals
 - d. Mammals

INHERITANCE

A. Select the correct answer.

1. _____ are small segments of DNA.
 - a. Genes
 - b. Nucleic acids
 - c. Chromosomes
 - d. All of the above
2. _____ is the different forms of gene responsible for the same trait.
 - a. Centromere
 - b. Character
 - c. Trait
 - d. Allele
3. Natural selection alters:
 - a. Individuals
 - b. Populations
 - c. Races
 - d. Phyla
4. A plant has genotype RrSs. How many different gametes would be produced?
 - a. Three
 - b. Four
 - c. Six
 - d. Eight
5. Speciation results in:
 - a. A new gene pool is formed
 - b. Evolutionary path of a species converge
 - c. Hybrid species is formed
 - d. Shows differences in physical traits.
6. Phenotype expresses:
 - a. Genetic makeup
 - b. Physical makeup
 - c. Chemical composition
 - d. Metabolism
7. _____ is histone plus DNA.
 - a. Centromere
 - b. Chiasma
 - c. Nucleosome
 - d. Chromatin
8. _____ is an allele which shows itself despite being heterozygous.
 - a. Dominant
 - b. Recessive
 - c. Co-dominant
 - d. Incomplete dominant
9. The central dogma consists of:
 - a. DNA + RNA = Protein
 - b. DNA → RNA + Protein
 - c. DNA → RNA → Protein
 - d. Protein → RNA > DNA
10. What would be the genotype of parents of homozygous recessive individual?
 - a. Homozygous dominant
 - b. Homozygous recessive
 - c. Heterozygous
 - d. Both 'b' and 'c'

MAN AND HIS ENVIRONMENT

A. Select the correct answer.

1. The direction of energy flow through an ecosystem is:
a. Unidirectional b. **Cyclic**
c. Reversible d. Multidirectional
2. The highest amount of nitrogen is present in:
a. Ocean b. **Atmosphere**
c. Phage DNA d. Fossil fuels
3. Overgrazing may produce:
a. **Soil erosion** b. Retention of useful species
c. Productive soils d. All of the above
4. Better environment can be achieved through three R's which are:
a. **Reduce, Reuse, Recycle**
b. Read, Register, Recall
c. Random, Reduce, Recall
d. Reduce, Rebuild, Restrict
5. Composition of food web is:
a. **Interlocking food chains**
b. Producers, consumers and decomposers
c. A portion of a food chain
d. A set of similar consumers
6. Prey-predator relationship contributes to balance::
a. Community b. **Population**
c. Ecology d. **Ecosystem**
7. Ecological pyramid represents:
a. Pyramid of energy b. **Pyramid of number**
c. Pyramid of biomass d. **All of the above**
8. Oxides of nitrogen and Sulphur in the environment react with water vapors to produce :
a. Acetic and Citric acid
b. **Sulphuric and Nitric acid**
c. Hydrochloric and Nitric acid
d. Sulphuric and Citric acid
9. Nitrogen gas can be obtained from nitrates and nitrites through a process known as:
a. Assimilation b. **Denitrification**
c. Ammonification d. Nitrification
10. Parasitism can be observed in
a. Aphids and ants
b. Rhizobium bacteria and leguminous plant
c. Lion and deer d. **Tapeworm and host**

